

Curbside Recycling, the Next Generation:

A Model for Local Government Recycling and Waste Reduction

Overview

Curbside recycling has become as American as apple pie. More than 139 million Americans now have access to curbside collection of a myriad of recyclable materials. More Americans now recycle than vote.

California was an early leader in the tremendous growth in this sector of the recycling industry. Curbside recycling programs were developed in most communities in California after the passage of the Integrated Waste Management Act (AB 939, Sher, Chapter 1095, Statutes of 1989 as amended [IWMA]).

Hundreds of millions of dollars have been invested in recycling by both the public and private sector during the past decade. These investments include collection vehicles and processing facilities to make curbside recycling an everyday reality for most Californians. However, the programs that were developed in the late 1980s and early to mid-1990s have begun to be replaced by the next generation of curbside recycling programs.

The next generation of programs is striving to collect even more recyclable materials as efficiently as possible. That has led to a number of key developments, including the following:

- Pay-as-you-throw programs, which provide residents with incentives to recycle more and waste less.
- Larger, more sophisticated materials recovery facilities (MRF) that can process more materials with no more residues.
- Increased collection of materials, especially mixed paper, corrugated cardboard boxes, and more types of plastics (despite continuing marketing problems.)
- Commingling of recyclable materials to collect more materials more quickly.

- Co-collection of garbage, recyclables, and/or organics in the same truck, but in different compartments.
- Collection of food discards and food-soiled paper with yard trimmings.
- Automated and semi-automated collection.
- Collection from single-family, multifamily, and small businesses in one truck.

Program Characteristics

Curbside programs have grown dramatically over the last decade. *BioCycle* magazine's annual "State of Garbage in America" series shows increases of more than 278 percent in California, and more than 375 percent nationally in population served since 1990. Programs and population covered in California reached a peak in 1996.

Studies completed for the Solid Waste Association of North America (SWANA) in California and nationally (see references) have produced data from hundreds of curbside recycling programs. These SWANA studies used statistical techniques to provide reliable information on the impacts of demographics, program designs, and financial features on the performance of curbside recycling programs.

The studies provide information on the impacts of program features—separate from the demographic differences in communities (for example, income, population, urban/rural) and other program features. The impact of commingled collection effectively holds the mix of materials accepted by programs constant.

The SWANA study results summarized in Table 2 are "additive." If the community's recycling rate is already 12 percent, the effect of moving to commingled collection (using the California results) would be to add 2 to 4 percentage points

Table 1: Number of Curbside Recycling Programs and Population Served—California and National

Year	California Number of Programs	California Population Served	National Number of Programs	National Population Served
1988			1,050	
1989			1,500	
1990	254	6,475,000	2,711	37,054,300
1991	369	11,000,000	3,912	65,064,300
1992	446	15,200,000	5,404	77,603,387
1993	464	15,548,000	6,678	101,353,325
1994	496	17,850,000	7,265	108,000,000
1995	503	18,700,000	7,375	121,000,000
1996	511	20,882,000	8,817	134,630,000
1997	496	17,800,000	8,937	135,568,000
1998	511	18,000,000	9,349	139,415,000

Sources: “The State of Garbage in America,” (annual series in *BioCycle* magazine); Jim Glenn, March 1990, pp. 48–53 and April 1990, pp. 34–41; J. Glenn and David Riggle, April 1991, pp. 34–38 and May 1991, pp. 30–35; J. Glenn, April 1992, pp. 45–55 and May 1992, pp. 30–37; Robert Steuteville and Nora Goldstein, May 1993, pp. 42–50; R. Steuteville et al., June 1993, pp. 32–37; R. Steuteville, April 1994, pp. 45–52 and May 1994, pp. 30–36; R. Steuteville, April 1995, pp. 54–63 and May 1995, pp. 30–37; R. Steuteville, April 1996, pp. 54–61 and May 1996, pp. 35–41; N. Goldstein, April 1997, pp. 60–67; N. Goldstein and J. Glenn, May 1997, pp. 71–75; J. Glenn, April 1998, pp. 32–43 and May 1998, pp. 48–52; J. Glenn, April 1999, pp. 60–71.

of recycling. The new recycling total would be 14 to 16 percent. Adding multiple changes together will yield results that are close to (but not exactly) what would be expected.

The California study also examined which program features were associated with higher and lower program costs. Table 3 summarizes which program changes might be most cost-effective for a community.

Those changes that add lots of tonnage (Table 2) and decrease costs—or cost very little (Table 3)—show the most promise for cost-effective programs in communities.

The combination of these findings suggest that the best ways for communities to increase tonnage most cost effectively would be to take the following actions:

- Implement pay-as-you-throw rates.

This approach would provide the largest increase in tonnages for recycling, and the cost impacts are small. (Studies other than the referenced studies have shown no increased costs or decreases in costs when implementing pay-as-you-throw (or “variable rates” in most communities). Pay-as-

you-throw rates also increase yard waste recycling tonnages, and they encourage residents to be more careful in what they buy so they can avoid creating wastes. Preventing waste is the cheapest waste management strategy.

Communities in California usually charge double for twice the service level (“a can is a can”). A few communities in the state charge even higher premiums, which could be more than twice the 30-gallon rate for 60 gallons of service.

- Commingle collection.

Commingling results in extra recycling tonnages and lower costs. However, suitable processing facilities are required to make this work successfully.

In the early years of recycling, three-bin separated programs were quite common. Commingling was considered more problematic. Program managers encouraged customers to think of the materials as a resource, not just another garbage stream. In addition, contamination and materials quality were legitimate concerns, because processing facilities for commingled programs were generally not available.

Table 2: Estimated Impacts of Program Design Options on Recycling Diversion

Program Feature	National Estimated Recycling Impact	California Estimated Recycling Impact
Variable rates	+5 to 6% points	+3 to 4% points
Weekly recycling collection	+2 to 4% points	Not estimated
Add materials	+2 to 4% points	+3 to 5% points
Commingled collection	+1 to 3% points	+2 to 4% points
Older programs		+3 to 5% points
No separate recycling charges		+2 to 4% points
Providing bins		+1 to 2% points

Sources: Lisa Skumatz, "Nationwide Diversion Rate Study," 1996; and "Achieving 50% in California," 1999. SERA, Inc., used with permission of the author.

In large part due to the IWMA, the public and private sectors in California have invested hundreds of millions of dollars to develop much greater processing capacity. In recent years, new processing capacity has been built with the capabilities of processing commingled recyclables without increasing the amount of residue from sorting those materials at a MRF.

The biggest concern about commingling has been the concern that materials recovered would be less valuable. In some instances, that has happened. However, with aggressive marketing and market development programs, this effect can be minimized.

One of the most powerful forces in favor of commingling has been the increased number of materials curbside recycling programs are able to collect.

In addition, due in large part to concerns about worker injuries and costs of worker compensation, many communities have adopted automated collection programs. Automated commingled programs reduce costs and increase consumer convenience.

Table 3. Estimated Percentage Changes in Program Costs from Program Choices and Changes

Program Feature	Estimated Cost Impact
Commingled collection	20 to 35% lower
Less than weekly collection	20 to 40% lower
Mandatory recycling	10 to 25% lower
Older program	10 to 25% lower
Automating collection	5 to 15% higher
Adding variable rates	10 to 20% higher
Adding new materials	15 to 35% higher

Sources: Lisa Skumatz, "Nationwide Diversion Rate Study" and "Achieving 50% in California." SERA, Inc., used with permission of the author.

The combination of these factors has made commingled collection programs more attractive and cost-effective to many communities.

Commingled programs fit very well with less frequent collection. This program (potentially combined with automation) can lead to very substantial reductions in the cost of providing service.

Commingled programs are moving toward pulling out one material (either paper or glass) and setting that alongside or on top of the recycling container. This minimizes the key contamination problem from commingled collection. The City of Seattle keeps the glass separate. Most of the programs in Massachusetts pull out the paper separately.

- Every-other-week collection.

Lower frequency collection decreases costs dramatically, and it results in only small decreases in recycling tonnage. The tonnage decrease could be offset by other changes. The dramatic cost savings from this approach are due to the greater efficiency in collection. It is very inefficient for a

truck to pick up nearly empty containers every week. Instead, every other week collection means houses put out more materials and/or more containers. This approach can be used for commingled or separated programs. Frequency changes require greater promotions work with residents to ensure that they know which weeks they are to recycle in their neighborhood.

- Add materials.

Adding more eligible materials to a recycling program will result in greater tonnages. When asked about program changes, more than 20 percent of communities (in a survey of more than 600 communities across the U.S.) indicated they had added materials during the previous two years. In decreasing order of frequency, the study found communities had added the following materials:

- ▣ Mixed paper
- ▣ Plastics (a variety)
- ▣ Cardboard
- ▣ Paper
- ▣ Glass
- ▣ Metal cans

Only about 5 percent indicated they had dropped materials (most commonly mixed paper, plastics, glass, and cardboard).

The results from Table 2 on page 3 indicate that adding materials can lead to significant increases in the amount of recyclables recovered through collection programs, adding 2 to 5 percentage points. Adding materials makes programs more useful for residents and provides them additional savings on their garbage bills. However, this change can also increase program costs by 15 to 35 percent, depending on the system and material.

The types of materials added have to be carefully coordinated with collection vehicle capacities and processing capabilities. Because adding new materials to the collection program create increased costs, this approach is recommended when other changes are made that may offset the increased costs of new materials.

Automation, Blue Bag, and Wet/Dry Sorts

Recycling cost savings and efficiency improvements reflect changes in demand by local communities. These savings result from:

- Collecting more recycling materials per stop.
- Making quicker stops.
- Compiling larger loads between unloading.

Table 4: Advantages of Commingled vs. Separated Recycling Collection

Separated	Commingled
Cleaner materials to market	Less complicated trucks and collection; fewer compartments needed
Less expensive processing; don't need extensive equipment or facility to sort out materials	Faster/cheaper collection; can use automated/semi-automated collection systems
Greater consumer awareness of materials	Easier to add/subtract materials because changing containers is unnecessary, and space is available
Commingled usually separates at least one material (glass or paper)	Bin(s) not as short as separated containers; less bending for collectors
	Can use larger containers and covered containers; can collect less frequently
	More convenient for customers
	Higher tonnage of materials than separated programs
	Relatively easy to explain to customers

Certainly, commingled collection and decreasing frequency can help achieve these objectives, but other strategies are of interest. The California SWANA study examined the performance of a variety of modified collection systems for

Table 5: Comparison of Alternative Recycling Collection Systems

Technology	Advantages	Disadvantages	Outlook
<p>Automated collection (commingled)</p> <p>Commingled collection of recycling carts with full automation</p>	<p>Improved tipping efficiency</p> <p>Increased load compaction</p> <p>Facilitates reduced collection frequency</p> <p>Lower labor costs</p>	<p>Compaction and glass breakage concerns</p> <p>Requires more processing or sorting for commingled recyclables</p> <p>Trucks have higher first costs and higher maintenance</p> <p>Special containers needed</p> <p>Automation requires a higher percentage of streets without obstacles</p>	<p>Potential cost savings due to decreased collection labor</p> <p>Can work in rural and urban areas</p> <p>Data collection thus far shows similar diversion and slightly higher costs than average for California communities</p>
<p>Split collection</p> <p>Carts and vehicles that simultaneously collect refuse and recycling in separate compartments</p>	<p>One-truck collection</p> <p>Eliminated vehicle routes</p> <p>Efficiency in rural settings</p>	<p>Processing and disposal sites for the two streams must be at the same location</p> <p>“Fixed” ratios may cause trucks to go to facility before both compartments are full</p> <p>Yard waste programs usually still need to be separate because of seasonal variations in volume</p>	<p>Potential cost savings, particularly in rural or long drive time areas, due to one-pass collection</p> <p>Being tested in several locations; data not very strong yet</p> <p>Promising results in Iowa, Olympia, Wash., and other locations reported in January 1999 <i>BioCycle</i> magazine</p>
<p>Blue bags version of co-collection</p> <p>Recyclables are placed in bags and collected with the solid waste in a traditional packer to be sorted at the transfer facility</p>	<p>Does not require new collection vehicles</p> <p>Eliminates vehicle routes</p> <p>Efficiency in rural settings</p>	<p>Increased contamination</p> <p>Increased sorting costs</p> <p>Does not allow for automated tipping unless commingled with garbage in one container</p> <p>If one container is used, that eliminates the possibility for variable rates</p>	<p>Seems to make great sense, but very limited data available</p> <p>Wide variation in performance (7% to 20% diversion)</p> <p>Field and processing experience (and costs) not promising</p> <p>Several programs have been discontinued</p>
<p>Wet/dry and three stream collection</p> <p>Collection of “wet” and “dry” streams; wet is compostable, dry is sorted into recyclables and landfilled materials</p>	<p>Good recovery rates</p> <p>Multiyear field experience</p> <p>Fewer collections per week</p>	<p>Initially may be confusing to residents</p> <p>Changes traditional recyclables collection and processing</p>	<p>Field data in one community with multiple years of experience shows 55% diversion and significantly lower costs than programs with multiple collections per week</p> <p>Promising as a technology to deliver higher recycling at lower cost</p>

Source: Lisa Skumatz, “Achieving 50% in California.” SERA, Inc., used with permission of the author.

recycling. The study found some promising signs of increased efficiency, and in some cases they saw increased diversion from recycling collection. Program costs and diversion from these programs were compared with those from more “standard” programs in California.

Unfortunately, few of the programs around the nation are able to provide cost and diversion data for these systems. This shortage of reliable data (beyond a few case studies in the literature) makes it hard to tell if any of the technologies will offer consistent performance in delivering increased diversion and reduced costs.

Blue bag programs seem to provide strong benefits, but some communities report contamination problems and poor or volatile performance. This indicates a need for a stronger track record for blue bag programs. The exception was wet/dry collection, demonstrated in Canada. That program provided high diversion at consistent costs.

Communities that pursue automated collection should follow these procedures:

- Buy the best truck possible to minimize the amount of breakdowns and maintenance costs.
- Assume a higher percentage of “backup” trucks than average because of maintenance issues.

Advantages and disadvantages, and the projected outlook for these alternate collection systems, are summarized in Table 5 on page 5.

Costs, Economics, and Benefits

Average Costs of Curbside Recycling

The SWANA study of more than 110 California communities found an average curbside recycling cost of about \$2.40 per household per month. This information is somewhat weighted toward larger communities. Combined curbside recycling and yard waste program costs showed patterns of lower costs in communities with the following characteristics:

- Older recycling programs.
- More suburban or rural areas.
- Lower population areas.
- Areas that used mixed waste MRFs.

However, examining the services included in curbside recycling rates may not provide a clear understanding of the comparative program costs. This is because of the many different ways communities have chosen to charge for this service.

In some communities, there is no separate charge for curbside recycling. Program cost estimates provided in these instances do not necessarily equal the actual costs.

Other communities may charge for curbside recycling, but that charge may not equal the full cost of providing the service. The charges may be set based on a combination of costs and perceptions about appropriate levels for the charge (or what neighboring communities charge).

Relationship of Curbside Recycling Rates and Garbage Rates

Prices proposed by haulers as part of combined residential and commercial service often subsidize residential garbage and/or recycling rates by commercial ratepayers. The actual costs for these services are often viewed as proprietary.

Therefore, how accurately the rates proposed reflect the actual cost of service is unknown.

Higher garbage rates and higher differentials in pay-as-you-throw rates continue the incentive to increase recycling and waste prevention (although rates that are twice as high do not lead to twice the recycling).

Following are two arguments for and against embedding the costs of recycling programs in garbage rates:

- Embedding recycling costs in garbage fees adds to the “costs” in the garbage rates. The differentials for additional service can be made higher, providing a stronger incentive for recycling. The California SWANA study indicates that embedded fees were associated with higher recycling rates.
- If recycling is charged separately, low disposers will have higher bills and high disposers will have lower bills than if the costs for the program were embedded in the garbage fee. Keeping a separate charge for recycling provides a signal to residents that recycling is not free. Solid waste charges vary widely across the state.

In the San Francisco Bay Area, rates in 1999 for 30 gallons of service (with other programs included) varied from just under \$7 to almost \$24 monthly for weekly collection service. The California SWANA study found an average “garbage-only” cost statewide of about \$15.40 per household per month. These costs tended to be lower in urban and high population areas where there was more competition for services.

Case Study: San Francisco Fantastic Three Program

After two and a half years of pilot programs, the City and County of San Francisco and one of its permitted haulers, Sunset Scavenger Company, have started their new Fantastic Three program. This innovative residential curbside collection program includes separate collection and composting of mixed organic materials (all food scraps, food-soiled paper, and yard trimmings). The program makes San Francisco the first large U.S. city to initiate a large-scale curbside collection program for food discards.

The impetus for the program was due in part to a 1996 waste characterization study that indicated residents were throwing away 200,000 tons of garbage every year. Thirty percent of this was food. San Francisco residents generally have smaller yards than most locations in California, so food discards are a larger percentage of their overall residential waste. The city determined that capturing residential food discards, along with yard trimmings, could be key to meeting the State’s 50 percent diversion goal.

The city began planning pilot programs with Sunset Scavenger—a subsidiary of Norcal Waste Systems—in fall 1996, and they became operational in July 1997. The programs were intended to test the feasibility of collecting a range of residential organics, from yard trimmings only to all food materials. The programs were designed to test and evaluate collection containers, vehicles, outreach needs, and processing needs. They were also comparing recycling patterns in neighborhoods with different demographics.

Eventually, more than 9,300 households were targeted for services. They received lidded wheeled carts (Toter brand) for all the organics

pilot programs, which fell into one of seven categories:

- Weekly yard trimmings only in a 32-gallon green cart.
- Weekly yard trimmings and vegetative food discards in a 32- or 64-gallon green cart.
- Biweekly yard trimmings only in a 32- or 64-gallon green cart.
- Weekly collection using a split 64-gallon cart for yard trimmings and vegetative food discards (organic materials on one side; trash on the other).
- Weekly collection using a split 64-gallon cart for yard trimmings and vegetative food discards (organic materials on one side; mixed recyclables on the other).
- Weekly collection using a split 64-gallon cart for yard trimmings, all food discards, and soiled paper (organic materials on one side; recyclables on the other).
- Fantastic Three program: yard trimmings, all food scraps, and soiled paper in one 32-gallon green cart; commingled recyclables in a second 32-gallon blue cart; and remaining trash in a third 32-gallon black cart.

The city also conducted pilot programs testing different recycling configurations.

Because the addition of food wastes was a major factor in designing these programs, this case study focuses on issues related to that addition to curbside recycling services. Organics recycling information from the pilot programs are summarized in Table 6 on page 8.

In September 1998, the city surveyed households in the pilot programs to determine resident satisfaction. The city found that the majority preferred their new collection system to that of their previous trash and blue bin recycling system. The one exception was the organics/trash split cart, which only 44 percent of participants preferred. Twenty percent rated it equal to their previous service.

Table 6: Results of San Francisco's Organics Pilot Program

Start Date	Pilot Program	Avg. Lb. Of Organics/ Drive-By	Weekly Set-Out Rate (%)	Monthly Participation Rate (%)	Compostables (% of Residential Generation, Excluding Recyclables)
7/97	Yard trimmings only	5	20	45	11
8/97	Yard trimmings & veg.* food	6	22	55	15
3/98	Biweekly yard trimmings	13 (6.5 weekly)	30 (15 weekly)	NA	11
3/98	Split yard trimmings & veg./trash	7	50	75	26
3/98	Split yard trimmings & veg./recyclables	6	40	67	13
10/98	Yard trimmings & all food	5	20	NA	NA
4/99	Fantastic Three	9**	40	60	25

*Veg.: vegetative food scraps (no meat or cooked food)

**Includes five small businesses with compostables collection. Residential only estimated at 8 lb.

Source: Jack Macy, organics recycling coordinator, San Francisco solid waste management program, 2000.

The most frequent customer complaint was about the size and handling of the 64-gallon split cart. The pilot route with the most complaints about container size was the organics/trash split route. There were very few complaints about separating food (for example, messiness or smell).

The city and Sunset Scavenger found that while all the pilot programs increased diversion, using separate dedicated carts was preferable. Dedicated carts provide the most flexibility in size (from 20 to 96 gallons). Split carts were not available in 20- or 32-gallon sizes or with unequal bisections. The split carts required more maintenance and resulted in lower resident and hauler satisfaction.

The city and Sunset Scavenger also determined that the 32-gallon cart size for collecting organics (as well as for commingled recyclables) was the most appropriate size. Only a few households

requested the larger 64-gallon size. In the pilot programs, extra organics that did not fit into the collection cart were set out less than 5 percent of the time.

The Fantastic Three program, which began as a pilot in April 1999, integrated the best elements of the previous pilots. Approximately 2,800 households were provided with three new 32-gallon carts: one blue cart for recyclables (paper, bottles, and cans) commingled together; one green cart for compostables (yard trimmings, all food scraps, and soiled paper); and one black cart for the remaining trash that is not recyclable or compostable.

In addition, residents received a 2-gallon kitchen pail to facilitate the separation of kitchen food scraps. Outreach materials encourage them to use

paper bags or newspaper to wrap their food if desired to keep the bins cleaner.

Outreach strategy and materials were similar to earlier pilot programs, since these had proven effective. Outreach materials included several trilingual (English, Chinese, and Spanish) brochures: a direct mailing, including a letter from the mayor, a detailed brochure delivered with the bins, and labels affixed to each bin with recycling do's and don'ts.

Residents were also telephoned within a week of receiving their new collection containers to make sure they received information and understood the program.

The Fantastic Three pilot included 50 small businesses that were within the residential neighborhood pilot area and that had volumes appropriate for Toter collection service. Five of these businesses are small produce stores and restaurants.

Including these businesses contributes significantly to the quantities of organics and helps buffer variations in seasonal yard trimming generation. This increases overall efficiency and diversion. Sunset Scavenger provided additional in-person outreach and training to the businesses to gain their participation. Businesses did not receive blue and green bins unless they agreed to participate in advance.

In the initial Fantastic Three pilot area, Sunset Scavenger used two vehicles with split compartments. The capacity was 29 cubic yards (60 cubic yards total), and the vehicles had dual-compartment compacting. Each used a one-person crew to collect recyclables and trash. Recyclables were deposited in the 11.6-cubic-yard compartment. Trash went in the 17.4-cubic-yard compartment.

The truck bodies are Labrie with Volvo chassis (two other makers were tested). A crew person collects compostables in a separate dedicated vehicle with a side-loading single compartment.

Once collected, organics are delivered to Norcal's composting facility at the B&J Landfill in Dixon, 65 miles northeast of San Francisco. The facility uses a horizontal grinder, a forced aerated enclosed "Ag-Bag" composting system (which involves composting for a two-month plus period),

screening down to 3/8-inch, and curing. The resulting compost is blended and marketed through a soil company, ReadyGro. The product is sold in bulk for landscaping and in bags for retail markets.

The pilot Fantastic Three program had better results overall than any of the previous pilot programs. From May through December 1999, the Fantastic Three program diverted an average of almost 46 percent from the landfill (14 percent from organics and 32 percent from recyclables).

On some days the diversion level has exceeded 50 percent. The diversion rate for the pilot neighborhood increased by more than 90 percent. Almost two-thirds of this increase was due to the new compostables collection.

A survey of residents in the program found that 73 percent liked the program more than the recycling and trash collection services they previously had.

Based on the success of the Fantastic Three pilot program and the need to increase diversion, Sunset Scavenger developed a plan, in cooperation with the city, for citywide expansion of the Fantastic Three program. Under the plan, the program will be offered to almost two-thirds of the city's households (more than 200,000 households) during the next three and a half years.

The new routes started in February 2000. The city expects to add a new five-day route approximately every three weeks. After a year and a half, the rate of expansion is projected to increase.

The city expects to divert an additional 50,000 tons per year of residential recyclables (including organics), from landfill disposal through the Fantastic Three program. Residents have demonstrated that they support collecting residential compostables, including all food. Such a program is feasible, and it has great potential for significant diversion in a cost-effective and sustainable manner.

Costs, Economics, and Benefits

Implementing the Fantastic Three program citywide will require purchasing a new fleet of dual compactor vehicles and thousands of containers. Vehicles and containers for the first months of expansion have been ordered.

Sunset Scavenger believes it can provide the expanded program at a cost similar to continuing

the original system over the long-term, given the collection efficiencies of co-collection. The company expects initial program costs to be initially higher as the company purchases new equipment. However, because Sunset Scavenger needs to replace its existing vehicle fleet in the near future, costs are likely to balance out over 10 years.

Recycling and composting service is included in the rates residents pay for trash, at no extra cost. Residents can actually save money by participating and switching to a smaller trash container (for example, 20 gallons).

Equipment costs for the pilot program are summarized in Table 7.

Table 7: Sunset Scavenger's Equipment Costs (for City of San Francisco Residential Program)

Equipment Item/Service	Unit Cost
Dual compactor vehicle	\$192,000
Organics collection vehicle	\$142,000
32-gallon container	\$35
64-gallon container	\$41
2-gallon kitchen pail	\$3.50 to \$4
Container delivery with outreach materials (\$/cart)	\$2 to \$3

Sources: Jack Macy, organics recycling coordinator, City of San Francisco; and Ken Pianin, Sunset Scavenger Company, San Francisco, 2000.

Funding Mechanisms

Sunset Scavenger's costs are funded through the rates it charges customers for trash service.

Sunset Scavenger included the cost of the pilot collection programs in its rate application submitted in September 1996 and in its rates effective March 1997.

Challenges and Opportunities in Implementation

For the initial set of pilot programs, the food collected consisted only of vegetative food (fruit and vegetable scraps, along with coffee grounds and tea bags). The available composting facilities

at the time were permitted and willing to take only vegetative material.

Under California's tiered composting regulations and the permit in place, available facilities could accept residential vegetative food but no meat. In addition, Sunset Scavenger was more comfortable starting off with collecting vegetative materials. The company believed that residents would be more receptive to separating organic material, since it might be less messy than meat or an all-food mix.

In the summer of 1998, a new permit allowed processing capacity for all food material at the B&J composting facility. Starting in October 1998, all food scraps, including meat and food-soiled paper, were added to some of the pilots. Previously, Sunset Scavenger took the compostables to the West Contra Costa Sanitary Landfill composting facility in the City of Richmond.

In the first set of pilots, participants in the yard and vegetative food scraps collection program were given a 2-gallon kitchen pail and a set of 24 cellophane-lined paper bags (from Foodcycler by Woods End Research Laboratory) to facilitate food separation and reduce potential messiness.

The use of the bags was successful, and they composted well. However, the city and Sunset Scavenger decided to try collection without paper bags, given cost and distribution concerns. Residents were then encouraged to use regular paper bags or newspaper to line their pail if desired.

One goal of the pilot programs was to assess collection vehicles and containers. Sunset Scavenger wanted to reduce worker injuries while striving to increase efficiency in collection of all materials. The pilots tested both semi- and fully-automated side-loading vehicles. Extensive street parking in most of San Francisco significantly limits the use of fully automated vehicles. Thus, the city and Sunset Scavenger settled on semi-automated side-loading vehicles for the citywide organics collection program.

Tips for Replication

- Implement pay-as-you-throw "a can is a can" garbage rates, with recycling costs included in the rate.

- Consider commingled collection if sufficient processing facilities are located in your area.
- Phase in automated or semi-automated collection vehicles if a contract is already in place, or specify them for the beginning of a new contract.
- Consider co-collection of two of the three primary materials: garbage, commingled recyclables, and/or yard wastes in the same vehicle.
- Collect food discards (all types, if possible) and soiled paper with yard trimmings, if yard trimmings are collected in rolling carts and if local composting facilities can process those materials together.
- Collect recyclables from small businesses through curbside recycling programs.
- Consider adding materials when you make other changes that improve collection efficiencies.
- Use pilot programs to test new technologies and approaches. Use focus groups and other marketing techniques to scientifically evaluate the success of those pilot programs.

References

CIWMB Publications

Many CIWMB publications are available on the Board's Web site at:
www.ciwmb.ca.gov/Publications/.

To order hard copy publications, call 1-800-CA-Waste (California only) or (916) 341-6306, or write:

California Integrated Waste Management Board
 Public Affairs Office,
 Publications Clearinghouse (MS-6)
 1001 I Street
 P.O. Box 4025 (mailing address)
 Sacramento, CA 95812-4025

Other Publications

Farrell, Molly. "Split Body Trucks Carry their Weight." *BioCycle*, January 1999, pp. 44–46.

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www.jgpress.com.

Resource Recycling. P.O. Box 42270, Portland, OR, 97242-0270. (503) 233-1305, www.resource-recycling.com, info@resource-recycling.com.

MSW Management. Forester Communications Inc., P.O. Box 3100, Santa Barbara, CA, 93130. (805) 681-1300, www.forester.net/msw.html, publisher@forester.net.

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Credits and Disclaimer

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The energy challenge facing California is real. Every Californian needs to take immediate action to reduce energy consumption. For a list of simple ways you can reduce demand and cut your energy costs, see our Web site at www.ciwmb.ca.gov.